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THE YORKSHIRE CARBONIFEROUS FLORA

BY

ROBERT KIDSTON, F.R.S.E., F.G.S.

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RHABDOCARPUS Göpp. & Berger.

Rhabdocarpus elongatus Kidston.

Rhabdocarpus elongatus. Ante, pp. 63, 82, 121.

Additional locality.

Middle Coal Measures.

Hor.—*30 yards below Swallow Wood Coal.* Loc.—Oaks Colliery, Barnsley (W. Hemingway).

CARPOLITHUS Sternb.

Carpolithus bivalvis Göpp. & Berger.

Carpolithus bivalvis. Ante, pp. 64, 96, 122.

Additional locality.

Middle Coal Measures.

Hor.—*Swallow Wood Coal.* Loc.—Oaks Colliery, Barnsley (W. Hemingway).

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THE YORKSHIRE CARBONIFEROUS FLORA.

SIXTH REPORT

ON BEHALF OF THE YORKSHIRE FOSSIL FLORA COMMITTEE, FOR 1896.

BY ROBERT KIDSTON, F.R.S.E., F.G.S.

In presenting the Sixth Report on the Carboniferous Flora of Yorkshire to the members of the Yorkshire Naturalists' Union, the Committee wish to express their indebtedness to the following workers, whose labours have supplied the material from which the present Report is drawn up: to Dr. E. W. Wellburn and Mr. R. Rothwell, Sowerby Bridge; to Mr. E. Broadbent, Sowerby; to the late Mr. T. Saltonstall, Todmorden; to Mr. J. Spencer, Halifax; to Mr. J. W. Bond, Burmantofts, Leeds; to Mr. W. Gelder, Barnsley; and above all to Mr. W. Hemingway, Barnsley.

To a newspaper notice, for which I am indebted to Mr. E. Howarth, Curator of the Public Museum, Sheffield, my attention was called to the cutting on the Midland Railway, necessitated by the widening of the line at Brightside, near Sheffield. As the rocks passed through were rich in fossil plants, application for permission to collect specimens was made to Mr. W. L. Mugliston, Superintendent of the Midland Railway Co., who, along with the Chief Engineer, Mr. John Argyle, very kindly gave every facility to Mr. Hemingway and myself to visit the locality and examine the material removed from the cutting. For this kind permission the Committee wish to record their sincere thanks, as it enabled them to collect 39 species from Brightside, a number which would almost certainly have been increased, had we been able to visit

the operations sooner, but the work was well advanced and much of the fossiliferous strata had been passed through before the time of our visit.

In addition to collecting personally with Mr. Hemingway, on several subsequent occasions Mr. Hemingway visited Brightside, and it is chiefly to his labours that the Committee are indebted for the list of Brightside fossil plants given in this Report.

We also examined the specimens from Brightside secured by the Public Museum, Sheffield, and received every kindness and facility for studying them from Mr. Howarth. These did not, however, add any species to those observed by ourselves, though they comprised some interesting specimens. It is much to be regretted that a qualified collector had not been appointed as soon as the operations at Brightside were commenced, as the strata passed through were rich in fossils, and the rocks belong to a horizon from which we have few records. In future, on such favourable opportunities occurring, the Committee would esteem it a great favour if those aware of the circumstances would at once communicate with the Secretary of the Fossil Flora Committee or myself, as soon as possible, so that proper arrangements may be made for availing ourselves of all opportunities for increasing our knowledge of the Yorkshire Coal Flora.

The present Report, in addition to giving new localities and horizons for many species already known to occur in Yorkshire, records the occurrence of nine species not previously met with in the County, and of these, seven appear to be new to Britain.

The new records are :—

Sphenopteris adiantoides L. & H.
**Lonchopteris Eschweileriana* Andræ.
Lepidodendron Peachii Kidston.
**Sigillaria semipulvinata* Kidston.
**Sigillaria Micaudi* Zeiller.

**Sigillaria Davreuxii* Brongt.
**Sigillaria Feistmanteli* Geinitz.
**Sigillaria Sol* Kidston.
**Carpolithus ellipticus* Sternb.

Those believed to be new to Britain are marked with an *.

Since the last Report was handed in I have commenced a series of papers dealing more fully with some of the more interesting Yorkshire species than it is possible to do in these short Reports.

The first of these papers was published in 1896 * and is devoted to a description of the fructification and various forms assumed by *Dactylotheca plumosa* Artis sp. The second paper was published this year †. This contains the description and illustration of the following Yorkshire Plants :—

Sigillariostrobus rhombibractiatus and *Sigillariostrobus ciliatus*, two Sigillarian cones which had previously been included in the published reports as *Sigillariostrobus* sp.; *Sigillaria Sol*, and *Sigillaria semipulvinata*, which, though known to me for some years, were not included in any of the previous Reports as the plants were undescribed.

The two species of *Sigillariostrobus* were communicated to me by Mr. Hemingway, *Sigillaria Sol* by Mr. C. Bradshaw, and *Sigillaria semipulvinata* was first received from the late Mr. E. Tindal, Leeds, but subsequently I received specimens of the same plant from the late Mr. J. W. Davis, F.G.S., Halifax, and this year it was again sent me by Mr. J. W. Bond, Leeds. To Mr. Bond we are also indebted for the records of *Sphenopteris adiantoides* L. & H., *Sigillaria Micaudi* Zeiller, and *Carpolithus ellipticus* Sternb. *Lepidodendron Peachii* Kidston has been shewn me by Mr. Spencer, Halifax, and to Mr. Hemingway we are indebted for the additions to our list of *Sigillaria Davreuxii* Brongt. and *Sigillaria Feistmanteli* Geinitz.

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* On the Fossil Flora of the Yorkshire Coal Field, Trans. Roy. Soc. Edin., Vol. xxxviii, part 2, No. 5, pp. 203—223, Pls. I.—III.

† Ibid, Vol. xxxix., part I., No. 5, pp. 33—62, Pls. I.—III.

In conclusion I have to express the hope of the Committee that all those who have previously assisted us will continue to give us their help, and that others may be induced to join in this work. We feel sure that there are many workers interested in the study of the Coal Flora of Yorkshire with whom the Committee have not yet been in communication, and who may have specimens in their possession which the Committee would be glad to have the opportunity of examining. They therefore appeal to all such to communicate with them *, also to give notice of any opportunities for collecting fossil plants which may come to their knowledge, such as the sinking of pits or any other operations which may offer a favourable opportunity for investigating the Fossil Flora of Yorkshire.

Note on the Rocks passed through while widening the Railway at Brightside Station, about two miles East of Sheffield.

In a paper by Mr. C. Bradshaw, F.G.S., describing some examples of Ripple Marked Sandstones at Grimesthorpe Chemical Works †, Brightside, the horizon is given as 'one of the beds occurring above what is known as the Parkgate Rock.'

These rocks are on the same *horizon* as those from which the Fossil Plants were collected, but they are a considerable distance, about 200 yards, above the *Parkgate Rock*. Mr. Hemingway, who has studied *sections* of the district, has determined the beds from which the fossil plants were collected as '*Rock below Haigh Moor Coal*,' which is locally known as the *Brightside Rock*. The position of these beds is marked with an * in the appended section.

Section of Strata at Rockingham Colliery, Birdwell, near Barnsley, Yorkshire—(From the Transactions of the Midland Institute of Mining, etc., Engineers).

---

* Those who have specimens in their possession would oblige by communicating with Mr. R. Kidston, 24, Victoria Place, Stirling, who has undertaken the examination of the fossil plants on behalf of the Fossil Flora Committee.

† 'The Naturalist,' Oct., 1896, p. 319.

Name of Strata.	Thickness of Strata. Feet	Inches	Depth from Surface.
Surface	—	—	
Earth and clay	20	6	
Strong stone bind	13	6	
Stone and cank	6	0	
Strong stone bind	23	4	
Shale	2	0	
Swallow Wood or Haigh Moor Coal coal		3	22 yards—
clod		5	
coal	2	5	
Fire clay	2	3	
Spavin (underclay	6	8	
Coal		10	
Spavin	4	0	
* Strong stone bind / Rock	14 / 100	0 / 3	
Cannel Coal	1	5	
Blue bind	13	10	
Coal	1	4	
Spavin	2	5 ‡	

List of Fossil Plants from Railway Cutting, Brightside, near Sheffield :—

Sphenopteris obtusiloba Brongt.
Sphenopteris dilatata L. & H.
Sphenopteris trifoliolata Artis sp.
Sphenopteris spiniformis Kidston.
Sphenopteris furcata Brongt.
Renaultia Footneri Marrat sp.
Crossotheca Schatzlarensis Stur sp.
Pecopteris Miltoni Artis sp.
Dactylotheca plumosa Artis sp.
Mariopteris muricata Schl. sp.
Lonchopteris Eschweileriana Andræ.
Neuropteris tenuifolia Schl. sp.
Neuropteris obliqua Brongt. sp.
Calamitina varians Schl. sp.
Calamitina undulata Sternb. sp.
Calamites (*Eucalamites*) *ramosus* Artis sp.
Calamites (*Stylocalamites*) *Cistii* Brongt.
Calamocladus equisetiformis Schl. sp.
Calamocladus charæformis Sternb. sp.

‡ Only the upper portion of the section is given here.

Annularia radiata Brongt.
Annularia galioides L. & H. sp.
Sphenophyllum cuneifolium Sternb. sp.
Sphenophyllum cuneifolium var. *saxifragæfolium* Sternb. sp.
Sphenophyllum majus Bronn. sp.
Lepidodendron ophiurus Brongt.
Lepidodendron aculeatum Sternb.
Lepidodendron lycopodioides Sternb.
Lepidodendron obovatum Sternb.
Lepidodendron rimosum Sternb.
Lepidostrobus sp.
Lepidophyllum lanceolatum L. & H.
Lepidophloios acerosus L. & H. sp.
Bothrodendron minutifolium Boulay sp.
Sigillaria camptotænia Wood sp.
Stigmaria ficoides Sternb. sp.
Cardiocarpus fluitans Dawson.
Carpolithus sp.
Trigonocarpus sp.
Gnetopsis sp.
Pinnularia prostrata Artis sp.

Some of the specimens collected at Brightside are of special interest.

Lonchopteris Eschweileriana Andræ.

Several specimens of this fern were met with—a plant not previously recorded in Britain.

Lepidodendron rimosum Sternb.

This species is rare in Britain, though occurring in several of the Coal-fields. At Brightside it was fairly plentiful, and is represented by specimens illustrating portions of very old stems, branches, and branchlets.

Gnetopsis sp.

A few seeds of this interesting genus were also met with.

Although not belonging to the vegetable kingdom, it might be mentioned that Mr. Hemingway discovered a single specimen of a small species of *Palæoxyris*, which seems to differ from any I have previously seen.

SYNOPSIS OF ADDITIONAL SPECIES AND LOCALITIES.

CALAMARIÆ.

CALAMITES SUCKOW.

GROUP I.—CALAMITINA WEISS.

Calamitina varians Sternb. sp.

Calamitina varians. Ante, pp. 16, 66, 85, 99, 131.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Better Bed Coal.* LOC.—Venture Pit, Burmantofts, Leeds (Bond).

Calamitina varians var. **insignis** Weiss.

Calamitina varians var. *insignis.* Ante, p. 99.

MIDDLE COAL MEASURES.

HOR.—*Blue bind below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

Calamitina undulata Sternb. sp.

Stylocalamites undulatus. Ante, pp. 20, 68, 85.

Calamitina undulata. Ante, pp. 99, 131.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOCS.—Hickleton Main Colliery, near Rotherham (Gelder).—Fence Colliery, near Rotherham (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Parkgate Coal.* LOC.—Wombwell Main Colliery, Wombwell, near Barnsley (Gelder).

HOR.—*Silkstone Seam.* LOC.—Wheldale Pit, Castleford (Wellburn).

LOWER COAL MEASURES.

HOR.—*Elland Flags.* LOC.—Ringby Quarry, Halifax (Spencer).

GROUP II.—EUCALAMITES WEISS.

Eucalamites ramosus Artis sp.

Eucalamites ramosus. Ante, pp. 17, 67, 85, 132.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Ryland's Openworks, Worsborough Dale, near Barnsley (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Silkstone Seam.* LOC.—Wheldale Pit, Castleford (Wellburn).

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

GROUP III.—STYLOCALAMITES WEISS.

Stylocalamites Suckowii Brongt. sp.

Stylocalamites Suckowii. Ante, pp. 19, 67, 85, 100, 132.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*40 yards above Crow Coal.* LOC.—Moody's Quarry, York Lane, Leeds (Bond).

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

MILLSTONE GRIT.

HOR.—*Fourth Bed of Third Grit.* LOC.—Railway Cutting, Sowerby Bridge (Rothwell).

Stylocalamites Cistii Brongt.

Stylocalamites Cistii. Ante, pp. 21, 68, 85, 133.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

CALAMOCLADUS SCHIMPER.

Calamocladus equisetiformis Schl. sp.

Calamocladus equisetiformis. Ante, pp. 22, 68, 86, 133.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Hickleton Main Colliery, near Rotherham (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Parkgate Rock.* LOC.—Oaks Colliery, Barnsley (Hemingway).

HOR.—*Above Crow Coal.* LOC.—Quarry, Stoney Rock Road, Leeds (Bond).

HOR.—*Below Black Bed Coal.*—LOC.—Dolly Lane, Leeds (Bond).

Calamocladus charæformis Sternb. sp.

Calamocladus charæformis. Ante, pp. 86, 101, 133.

Calamocladus Roehli. Ante, p. 22.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Monckton Main Colliery, Barnsley (Hemingway).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

ANNULARIA STERNB.

Annularia galioides L. & H. sp.

1832. *Asterophyllites galioides* L. & H., Fossil Flora, Vol. I., pl. xxv., fig. 2.

1893. *Annularia galioides* Kidston. Trans. Roy. Soc. Edin., Vol. xxxvii., p. 317, Pl. II., fig. 4, 4A.

Annularia microphylla. Ante, p. 25.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

FILICACEÆ.

SPHENOPTERIS Brongt.

Sphenopteris obtusiloba Brongt.

Sphenopteris obtusiloba. Ante, pp. 28, 70, 135.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

Sphenopteris dilatata L. & H.

Sphenopteris dilatata. Ante, p. 102.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

Sphenopteris trifoliolata Artis sp.

Sphenopteris trifoliolata. Ante, p. 28.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOCS.—Cooper's Colliery, Worsborough Dale, near Barnsley (Gelder).—South Kirkby Colliery, near Pontefract (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

Sphenopteris Marratii Kidston.

Sphenopteris Marratii. Ante, p. 87.

Additional locality.

HOR.—*Barnsley Thick Coal.* LOC.—Monckton Main Colliery, near Barnsley (Hemingway).

Sphenopteris adiantoides L. & H.

1834 *Sphenopteris adiantoides* L. & H. Fossil Flora, vol. II., p. 91, pl. cxv.

1869. *Sphenopteris (Aneimioides) adiantoides* Schimper. Traité d. Paléont. Végét., vol. I. p. 401.

1836. *Adiantites concinnus* Göpp. Syst. Fil. Foss., p. 226.

1838. *Cyclopteris adiantoides* Sternb. Vers. II. p. 133.
1845. *Cyclopteris concinna* Unger. Synop. Plant. Foss., p. 56.
1848. *Sphenopteris obtusiloba* Sauveur (not Brongt.). Végét. Foss. de la Belgique, pl. xxv. fig. 1.
1877. *Diplothmema adiantoides* Stur. Culm Flora, Heft 2, p. (124) 230.
1890. *Adiantites recentior* Grand'Eury. Géol. et Paléont. du Bassin Houil. du Gard, p. 295, pl. v. fig. 6.

MIDDLE COAL MEASURES.

HOR.—*Blue Bind below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

Sphenopteris spiniformis Kidston.

Sphenopteris spiniformis. Ante, pp. 29, 70, 103.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

Sphenopteris Sternbergii Ett. sp.

Sphenopteris Sternbergii. Ante, pp. 31, 71.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Hickleton Main Colliery, near Rotherham (Gelder).

Sphenopteris furcata Brongt.

Sphenopteris furcata. Ante, p. 102.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Above Beeston Coal.* LOC.—Ward's Quarry, Clark Lane, Leeds (Bond).

RENAULTIA ZEILLER.

Renaultia Footneri Marrat sp.

Renaultia Footneri. Ante, pp. 31, 71, 104, 135.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Above Beeston Bed.* LOC.—Marsh Lane Tunnel, Leeds (Bond).

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

CROSSOTHECA ZEILLER.

Crossotheca Schatzlarensis Stur sp.

Crossotheca Schatzlarensis. Ante, pp. 33, 72, 105, 135.

Additional localities.

MIDDLE COAL MEASURES.

HOR. — *Barnsley Thick Coal.* LOCS.—Fence Colliery, near Rotherham (Gelder).—Glasshoughton Pit, Castleford (Wellburn).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

ZEILLERIA KIDSTON.

Zeilleria delicatula Sternb. sp.

Zeilleria delicatula. Ante, pp. 71, 88.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Rock.* LOC.—Cooper's Colliery, Worsborough Dale, near Barnsley (Gelder).

PECOPTERIS BRONGT.

Pecopteris Miltoni Artis sp.

Pecopteris Miltoni. Ante, pp. 36, 72.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Rock.* Cooper's Colliery, Worsborough Dale, near Barnsley (Gelder).

HOR.—*Barnsley Thick Coal.* LOCS.—Lundhill Colliery, Wombwell, near Barnsley (Gelder).—Old Oaks Colliery, near Barnsley (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

DACTYLOTHECA ZEILLER.

Dactylotheca plumosa Artis sp.

Dactylotheca plumosa. Ante, pp. 35, 106.
Sphenopteris crenata. Ante, p. 30.
Dactylotheca dentata. Ante, pp. 36, 106.
Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Rock.* Cooper's Colliery, Worsborough Dale, near Barnsley (Gelder).

HOR.—*Barnsley Thick Coal.* LOCS.—Hickleton Main Colliery, near Rotherham (*Type* and *forma crenata*) (Gelder).—Fence Colliery, near Rotherham (*Type* and *forma crenata*) (Gelder).—South Kirkby Colliery, near Pontefract (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

REMARKS :—In the first paper of the series dealing with the Fossil Flora of Yorkshire,* I have fully treated of the various forms which this fern assumes. To these various forms many specific names have been given, but they insensibly pass into each other. Such extreme forms as *Pecopteris dentata* Brongt. and *Sphenopteris crenata* L. & H. seem at first sight very distinct from each other, as well as from *D. plumosa* Artis sp., but they are connected by an unbroken chain of intermediate forms, which makes it quite impossible to regard them as other than mere conditions of the same fern. These different *forms* are dependent on the position the small fragments, with which one usually has to deal, held on the frond, which, from actual specimens from the Somerset Coal Field, we know to have been very large. The presence also of fruit in the specimens, somewhat alters the form of the pinnules.

* Trans. Roy. Soc. Edin., Vol. XXXVIII., part II., No. 5, pp. 203—223, Pls. I—III., 1896.

Several of these forms, as well as the fructification, are figured in the paper to which I have already referred.

MARIOPTERIS Zeiller.

Mariopteris muricata Schl. sp.

Mariopteris muricata. Ante, pp. 33, 72, 89, 106, 135.

Additional localities.

Middle Coal Measures.

Hor.—*Barnsley Thick Coal.* Locs.—Hargreave's Colliery, Rotherham (Gelder).—Roundwood Colliery, Kilnhurst, near Rotherham (Gelder).—Cadeby Colliery, Conisborough (Gelder).—Treeton Colliery, near Rotherham (Gelder).

Hor.—*Rock below Haigh Moor Coal.* Loc.—Brightside, near Sheffield.

Hor.—*Above Beeston Coal.* Loc.—Marsh Lane Tunnel, Leeds (Bond).

Hor.—*Above Crow Coal.* Loc.—Patent Brick Co.'s Quarry, Dolly Lane, Leeds (Bond).

Hor.—*Below Crow Coal.* Loc.—Quarry, Stoney Rock Road, Leeds (Bond).

Hor.—*Black Bed Coal.* Loc.—Low Moor (Spencer). Dolly Lane, Leeds (Bond).

Hor.—*Better Bed Coal.* Loc.—Low Moor (Spencer).

ALETHOPTERIS Sternb.

Alethopteris lonchitica Schl. sp.

Alethopteris lonchitica. Ante, pp. 37, 73, 89, 106, 136.

Additional localities.

Middle Coal Measures.

Hor.—*Barnsley Thick Coal.* Locs.—Fence Colliery, near Rotherham (Gelder).—Ryland's Open Works, Worsborough Dale (Gelder).—Nunnery Colliery, Attercliffe, Sheffield (Gelder).—Swaithe Main Colliery, near Barnsley (Gelder).—Cadeby Colliery, Conisborough (Gelder).—Old Oaks Colliery, near Barnsley.

HOR.—*Silkstone Seam.* LOC.—Allerton Main Pit, Castleford (Wellburn).

HOR.—*Above Beeston Coal.* LOC.—Marsh Lane Tunnel, Leeds (Bond).

HOR.—*Blue Bind below Beeston Bed.* LOC.—Hunslet, Leeds (Bond).

HOR.—*Below Crow Coal.* LOC.—Stony Rock Road, Leeds (Bond).

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds, (Bond).

Alethopteris decurrens Artis sp.

Alethopteris decurrens. Ante, pp. 38, 73, 90, 107.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOCS.—Hickleton Main Colliery, near Rotherham (Gelder). — Glasshoughton Pit, Castleford (Wellburn).

HOR.—*Silkstone Coal.* LOC.—Allerton Main Pit, Castleford (Wellburn).

Alethopteris davreuxii Brongt.

Alethopteris Davreuxii. Ante, pp. 73, 90, 107.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—South Kirkby Colliery, near Pontefract (Gelder).

Alethopteris valida Boulay.

Alethopteris valida. Ante, pp. 39, 90.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Below Beeston Bed.* LOC.—Hunslet, Leeds (Bond).

LONCHOPTERIS BRONGT.

Lonchopteris eschweileriana Andræ.

1865. *Lonchopteris Eschweileriana* Vorwelt. Pflanzen, p. 8., Pl. III., fig. 1.

1886. *Lonchopteris Eschweileriana* Zeiller. Flore Foss. Bassin Houil. de Valenciennes, p. 246, Pl. XXXIX., fig. 1.

MIDDLE COAL MEASURES.

HOR:—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

NEUROPTERIS BRONGT.

Neuropteris heterophylla Brongt.

Neuropteris heterophylla. Ante, pp. 40, 74, 90, 107, 136.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOCS.—Treeton Colliery, near Rotherham (Gelder).—Roundwood Colliery, near Rotherham (Gelder).—Glasshoughton Pit, Castleford (Wellburn).

HOR.—*Parkgate Rock.* LOC.—Oaks Colliery, Barnsley (Hemingway).

HOR.—*Silkstone Coal.* LOC.—Allerton Main Pit, Castleford (Wellburn).

HOR.—*Above Beeston Bed.* LOC.—Marsh Lane Tunnel, Leeds (Bond).

HOR.—*Above Crow Coal.* LOC. — Quarry, Stony Rock Road, Leeds (Bond).

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

Neuropteris tenuifolia Schl. sp.

Neuropteris tenuifolia. Ante, pp. 41, 75, 90, 108.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Parkgate Rock.* LOC.—Oaks Colliery, Barnsley (Hemingway).

Neuropteris obliqua Brongt. sp.

Neuropteris obliqua. Ante, pp. 39, 42, 74, 75, 108.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOCS.—Hickleton Main Colliery, near Rotherham (Gelder).—Cooper's Colliery, Worsborough Dale, near Barnsley (Gelder).—New Oaks Colliery, near Barnsley (Gelder).—Darfield Main Colliery, Darfield, near Barnsley (Gelder).—Cadeby Colliery, Conisborough (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

MEGAPHYTON ARTIS.

Megaphyton frondosum Artis.

Megaphyton frondosum. Ante, pp. 43, 109.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Upper Chevet Rock.* LOC.—Darfield Quarry, near Barnsley (Gelder).

SPHENOPHYLLEÆ.

SPHENOPHYLLUM BRONGT.

Sphenophyllum cuneifolium Sternb. sp.

Sphenophyllum cuneifolium. Ante, pp. 25, 69, 87, 116.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOCS.—New Gawber Colliery, near Barnsley (Hemingway).—Treeton Colliery, near Rotherham (Gelder).—Rother Vale, near Rotherham (Gelder).—Glasshoughton Pit, Castleford (Wellburn).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*About 35 feet above Beeston Bed.* LOC.—Ward's Quarry, Clark Lane, Leeds (Bond).

HOR.—*Black Bed Coal.* LOC.—Low Moor (Broadbent).

Forma **saxifragæfolium** Sternb. sp.

Forma *saxifragæfolium.* Ante, pp. 26, 69.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOCS. — South Kirkby Colliery, near Pontefract (Gelder).—Fence Colliery, near Rotherham (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

Sphenophyllum majus Bronn.

Sphenophyllum majus. Ante, pp. 53, 78.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Treeton Colliery, near Rotherham (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

LEPIDODENDRON STERNBERG.

Lepidodendron ophiurus Brongt.

Lepidodendron ophiurus. Ante, pp. 45, 76, 111.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

Lepidodendron lycopodioides Sternb.

Lepidodendron dichotomum. Ante, p. 44.

Lepidodendron lycopodioides. Ante, pp. 44, 109.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOCS. – Oaks Colliery, Barnsley (Hemingway). - Brightside, near Sheffield.

HOR. —*Shale over Parkgate Rock.* LOC.—Oaks Colliery, Barnsley (Hemingway).

HOR.—*Ironstone Bed over Black Bed Coal.* LOC.—Schole's Pit, Low Moor (Wellburn).

Lepidodendron aculeatum Sternb.

Lepidodendron aculeatum. Ante, pp. 45, 76, 91, 111, 138.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR. —*Parkgate Coal.* LOC.—Barrow Colliery, near Barnsley (Hemingway).

HOR. —*Silkstone Seam.* LOC.—Allerton Main Pit, Castleford (Wellburn).

HOR.—*Black Bed Coal.* LOC.—Low Moor (Rothwell).

HOR.—*Better Bed Coal.* LOC.—Low Moor (Spencer).

MILLSTONE GRIT.

HOR. —*Rough Rock, top of first Member of Millstone Grit.* LOC.—Mount Tabor, near Halifax (Rothwell).

Lepidodendron obovatum Sternb.

Lepidodendron obovatum. Ante, pp. 46, 76, 111.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Kent's Thick Coal.* LOC.—Wharncliffe Woodmoor Colliery, Carlton, near Barnsley (Hemingway).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

MILLSTONE GRIT.

HOR.—*Top bed of third Member of Millstone Grit.* LOC.—Sowerby, near Sowerby Bridge (Saltonstall).

HOR.—*Fourth Member of third Millstone Grit* (Rothwell).

Lepidodendron peachii Kidston.

1885 *Lepidodendron peachii* Kidston. Ann. & Mag. Nat. Hist., series 5, vol. xv., p. 363, pl. xi. fig. 6.

1885 *Lepidodendron peachii* Kidston. Proc. Roy. Phys. Soc. Edin., vol. viii., p. 421, pl. xxi., fig. 6.

LOWER COAL MEASURES.

HOR.—*Soft Bed Coal.* LOC.—Sunnybank Pit, Southowram, near Halifax (Spencer).

Lepidodendron rimosum Sternb.

Lepidodendron rimosum. Ante, p. 138.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—East Gawber Colliery, Barnsley (Hemingway).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

REMARKS.—This species was comparatively common at the Brightside Railway Cutting. From the other two Yorkshire localities it is only represented by three specimens. *Lepidodendron rimosum*, as far as I have yet observed, is rare in Britain.

LEPIDOSTROBUS BRONGT.

Lepidostrobus variabilis L. & H.

Lepidostrobus variabilis. Ante, p. 50.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

Lepidostrobus lanceolatus L. & H. sp.

Lepidostrobus lanceolatus. Ante, pp. 50, 77, 112.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

LEPIDOPHYLLUM BRONGT.

Lepidophyllum majus Brongt.

Lepidophyllum majus. Ante, pp. 53, 78.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Fence Colliery, near Rotherham (Gelder).

LEPIDOPHLOIOS STERNB.

Lepidophloios acerosus L. & H. sp.

Lepidophloios acerosus. Ante, pp. 49, 77, 139.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

HOR.—*Above Beeston Coal.* LOC.—Marsh Lane Tunnel, Leeds (Bond).

HALONIA L. & H.

Halonia tortuosa L. & H.

Halonia. Ante, p. 50.

Halonia tortuosa. Ante, p. 139.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Parkgate Rock.* LOC.—Oaks Colliery, Barnsley (Hemingway).

MILLSTONE GRIT.

HOR.—*Uppermost bed of fourth Member of Millstone Grit.*

LOC.—Sowerby, near Sowerby Bridge (Saltonstall).

BOTHRODENDRON L. & H.

Bothrodendron minutifolium Boulay sp.

Bothrodendron minutifolium. Ante, pp. 52, 77, 112.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

SIGILLARIA BRONGT.

Sigillaria discophora König sp.

Sigillaria discophora. Ante, pp. 53, 78.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Wombwell Main Colliery, Wombwell, near Barnsley (Gelder).

HOR.—*Below Crow Coal.* LOC.—Wyke, near Low Moor (Spencer).—Quarry, Stony Rock Road, Leeds (Bond).

HOR.—*Ironstone Bed over Black Bed Coal.* LOC.—Schole's Pit, Low Moor (Wellburn).

HOR.—*Better Bed Coal.* LOC.—Venture Pit, Burmantofts, Leeds (Bond).

Sigillaria camptotœnia Wood sp.

Sigillaria camptotœnia. Ante, pp. 79, 95.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Fence Colliery, near Rotherham (Gelder).

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

Sigillaria tessellata Brongt.

Sigillaria tessellata. Ante, pp, 57, 79, 96, 141.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Kent's Thick Coal.* LOC.—Wharncliffe Woodmoor Colliery, Carlton, near Barnsley (Hemingway).

HOR.—*Barnsley Thick Coal.* LOCS.—Hickleton Main Colliery, near Rotherham (Gelder).—Carlton Main Colliery, near Barnsley (Hemingway).

HOR.—*Below Crow Coal.* LOC.—Quarry, Stony Rock Road, Leeds (Bond).

HOR.—*Ironstone Bed over Black Bed Coal.* LOC.—Schole's Pit, Low Moor (Wellburn).

MILLSTONE GRIT.

HOR.—*Rough Rock, first Member of Millstone Grit.* LOC.—Ovenden, Halifax (Spencer).

Sigillaria elegans Brongt.

Sigillaria elegans. Ante, p. 57.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Parkgate Coal.* LOC.—Barrow Colliery, Barnsley (Hemingway).

Sigillaria semipulvinata Kidston.

1897. *Sigillaria semipulvinata* Kidston. Trans. Roy. Soc. Edin., Vol. xxxix., part 1, No. 5, p. 57, Pl. III., figs. 1–5.

MIDDLE COAL MEASURES.

HOR (?)—Cinderford (late Mr. E. Tindal, Leeds).

HOR.—*Kent's Thick Coal.* LOC.—Wharncliffe Woodmoor Colliery, Carlton, near Barnsley (Hemingway).

HOR.—*Black Bed Coal.* LOC.—Low Moor (late Mr. J. W. Davis, Halifax).

HOR.—*Better Bed Coal.* LOC.—Venture Pit, Burmantofts, Leeds (Bond).

Sigillaria mamillaris Brongt.

Sigillaria mamillaris. Ante, pp. 54, 78, 141.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—East Gawber Colliery, near Barnsley (Saltonstall).—Hickleton Main Colliery, near Rotherham (Gelder).

Forma **vulgaris** Artis sp.

Forma *vulgaris.* Ante, p. 55.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Rotherham (Gelder).

HOR.—*Silkstone Seam.* LOC.—Allerton Main Colliery, Castleford (Wellburn).

Sigillaria micaudi Zeiller.

1886. *Sigillaria micaudi* Zeiller. Flore Foss. Bassin Houil. d. Valenciennes, p. 576, Pl. lxxxvi. figs. 11—12.

MIDDLE COAL MEASURES.

HOR.—*Better Bed Coal.* LOC.—Venture Pit, Burmantofts, Leeds (Bond).

Sigillaria scutellata Brongt.

Sigillaria scutellata. Ante, pp. 55, 141.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Woolley Colliery, Darton, near Barnsley (Hemingway).

HOR.—*Silkstone Seam.* LOC.—Allerton Main Colliery, Castleford (Wellburn).

Sigillaria rugosa Brongt.

Sigillaria rugosa. Ante, p. 113.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—East Gawber Colliery, Barnsley (Saltonstall).

Sigillaria davreuxii Brongt.

1836. *Sigillaria davreuxii* Brongt. Hist. d. Végét. Foss., p. 464, Pl. cxlviii.

1857. *Sigillaria davreuxii* Goldenberg. Flora Sarœp. Foss., Heft 2, p. 41, Pl. viii., fig. 5.

1870. *Sigillaria davreuxii* Schimper. Traité d. Paléont. Végét., vol. II., p. 83, Pl. lxviii., fig. 4.

1886. *Sigillaria davreuxii* Zeiller. Flore Foss. Bassin Houil. d. Valenciennes, p. 569, Pl. lxxxvi., figs. 7—10.

1836. *Sigillaria elliptica* var. *a* Brongt. Hist. d. Végét. Foss., p. 447, Pl. clii., fig. 3.

1848. *Sigillaria pulchella* Sauveur. Végét. Foss. Terr. Houil. de la Belgique, Pl. lii., fig. 2.

1876 *Sigillaria stenopeltis* Boulay. Terr. Houil. d. Nord de la France, p. 45, Pl. iv., fig. 6.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.— Oaks Colliery, Barnsley (Hemingway).

NOTE:—This species is represented by a single specimen.

Sigillaria feistmanteli Geinitz.

1865. *Sigillaria Feistmanteli* Geinitz. Neues Jahrb., p. 392, Pl. iii., figs. 4–4a.

1876. *Sigillaria Feistmanteli* Feistmantel. Vers. d. Böhm., Kohl.-Ablag., Abth. iii., p. 14, Pl. ii., figs. 4—5.

MIDDLE COAL MEASURES.

HOR.- *Parkgate Coal.* LOC. Barrow Colliery, Barnsley (Hemingway).

NOTE: This species is also only represented by a single example.

Sigillaria sol Kidston.

1897. *Sigillaria sol* Kidston. Trans. Roy. Soc. Edin., vol. xxxix., part 1, No. 5, p. 56, Pl. iii., fig. 6.

MIDDLE COAL MEASURES.

HOR. *Barnsley Thick Coal.* LOC.-Kilnhurst Pit, Rotherham.

NOTE:—I received the specimen, on which this species is founded, from Mr. C. Bradshaw, Sheffield, in 1888.

Sigillaria lævigata Brongt.

Sigillaria lævigata. Ante, pp. 95, 112.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Kent's Thick Coal.* LOC.—Wharncliffe Woodmoor Colliery, Carlton, near Barnsley (Hemingway).

HOR. *Rock below Haigh Moor Coal.* LOC.—Oaks Colliery, Barnsley (Hemingway).

Sigillaria ovata Sauveur.

Sigillaria ovata. Ante, pp. 56, 78, 94, 113.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Kent's Thick Coal.* LOC.—Wharncliffe Woodmoor Colliery, Carlton, near Barnsley (Hemingway).

HOR.—*Parkgate Coal.* LOC.—Barrow Colliery, Barnsley (Hemingway).

HOR.—*Silkstone Seam.* LOC.—Allerton Main Pit, Castleford (Wellburn.)

SIGILLARIOSTROBUS SCHIMPER.

Sigillariostrobus rhombibractiatus Kidston.

Sigillariostrobus sp. Ante, p. 58.

1897. *Sigillariostrobus rhombibractiatus* Kidston. Trans. Roy. Soc. Edin., Vol. xxxix., part 1, No. 5, p. 50, Pl. i., figs. 1—8, Pl. ii., figs. 10—11.

Sigillariostrobus ciliatus Kidston.

Sigillariostrobus sp. Ante, p. 58.

1897. *Sigillariostrobus ciliatus* Kidston. Trans. Roy. Soc. Edin., Vol. xxxix., part 1, No. 5, p. 53, Pl. ii., figs. 2—9.

NOTE.—I mention these two species here, as no specific names had been given to them in the earlier Reports.

STIGMARIA BRONGT.

Stigmaria eveni Lesqx.

Stigmaria eveni. Ante, p. 142.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Kent's Thick Coal.* LOC.—Wharncliffe Woodmoor Colliery, Carlton, near Barnsley (Hemingway).

CORDAITEÆ.

CORDAITES UNGER.

Cordaites principalis Germar sp.

Cordaites principalis. Ante, pp. 58, 80, 118, 143.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*White Rake Bed.* LOC.—Low Moor (Broadbent).

CARDIOCARPUS Brongt.

Cardiocarpus fluitans Dawson.

Cardiocarpus fluitans. Ante, p. 119.

Additional localities.

Middle Coal Measures.

Hor.—*Barnsley Thick Coal.* Loc.—Monckton Main Colliery, near Barnsley (Hemingway).

Hor.—*Rock below Haigh Moor Coal.* Loc.—Brightside, near Sheffield.

CARPOLITHUS Schlotheim.

Carpolithus ovoideus G. & B.

Carpolithus ovoideus. Ante, p. 121.

Additional locality.

Middle Coal Measures.

Hor.—*Shafton Coal.* Loc.—Notton, near Barnsley (Hemingway).

Carpolithus ellipticus Sternb.

1826. *Carpolithes ellipticus* Sternb. Essai Flore Monde Prim., Fasc. iv., p. xl., Pl. vii., fig. 1.

1855. *Carpolithes ellipticus* Geinitz. Vers. d. Steinkf. in Sachsen, p. 44, Pl. xxii. fig. 29.

1870. *Carpolithus ellipticus* Schimper. Traité d. Paléont. Végét., Vol. ii., p. 225.

1871. *Rhabdocarpus* (?) *ovoideus* Weiss. (*? In part.*) Foss. Flora d. Jüngst. Steinkf. u. d. Rothl., p. 206, Pl. xvii., fig. 4.

Middle Coal Measures.

Hor.—*Blue bind below Black Bed Coal.* Loc.—Quarry, Dolly Lane, Leeds (Bond).

Note :—Weiss. (l. c.) regards *Carpolithus ellipticus* as a variety of *Carpolithus ovoideus* G. & B.

TRIGONOCARPUS Brongt.

Trigonocarpus parkinsoni Brongt.

Trigonocarpus parkinsoni. Ante, pp. 61, 81, 120,

Additional localities.

MIDDLE COAL MEASURES.

HOR. — *Barnsley Thick Coal.* LOCS. — South Kirkby Colliery, near Wakefield (Gelder).—Glasshoughton Pit, Castleford (Wellburn).

HOR.—*Parkgate Rock.* LOC.—Oaks Colliery, Barnsley (Hemingway).

HOR.—*Below Crow Coal.* LOC.—Quarry, Stony Rock Road, Leeds (Bond).

Forma **amygdalæformis** G. & B. sp.

Forma *amygdalæformis.* Ante, pp. 61, 120.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Kent's Thick Coal.* LOC.—Wharncliffe Woodmoor Colliery, Carlton, near Barnsley (Hemingway).

POLYPTEROCARPUS GRAND'EURY.

Polypterocarpus sp.

Polypterocarpus. Ante, p. 63.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*Stanley Main Coal.* LOCS.—Parkhills Colliery, Wakefield (Hemingway).—Walton, near Wakefield (Hemingway).

HOR.—*Barnsley Thick Coal.* LOC.—South Kirkby Colliery, near Pontefract (Hemingway).

HOR.—*Parkgate Rock.* LOC.—Oaks Colliery, Barnsley (Hemingway).

ARTISIA STERNB.

Artisia transversa Artis sp.

Artisia transversa. Ante, pp. 59, 80.

Additional locality.

MIDDLE COAL MEASURES.

HOR.—*Barnsley Thick Coal.* LOC.—Glasshoughton Pit, Castleford (Wellburn).

Artisia approximata Brongt.

Artisia approximata. Ante, p. 144.

Additional localities.

MIDDLE COAL MEASURES.

HOR.—*40 yards below Crow Coal.* LOC.—Moody's Quarry, York Road, Leeds (Bond).

HOR.—*Below Black Bed Coal.* LOC.—Dolly Lane, Leeds (Bond).

MILLSTONE GRIT.

HOR.—*First Member of Millstone Grit.* LOC.—Ovenden, Halifax (Spencer).

GNETACEÆ.

GNETOPSIS RENAULT & ZEILLER.

Gnetopsis sp.

Gnetopsis sp. Ante, p. 64.

MIDDLE COAL MEASURES.

HOR.—*Rock below Haigh Moor Coal.* LOC.—Brightside, near Sheffield.

NOTE.—Since this Report was in type it has been found that the 'Brightside Rock' is the same as the 'Birdwell Rock' or 'Thornhill Rock' of Prof. A. H. Green and Mr. R. Russell (see Geology of the Yorkshire Coal Field, Mem. of the Geol. Survey of England and Wales, London, 1878, pp. 330 and 358).

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